THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EDWIN R. SMITH, JEFFREY M. SCHUETZ
and STANLEY LUSTIG

Appeal No. 1996-0328
Application 08/060,891

ON BRIEF

Before SCHAFER, LEE and TORCZON, Administrative Patent Judges.

SCHAFER, Administrative Patent Judge.

Decision on appeal under 35 U.S.C. § 134

Applicants appeal from the rejection of claims 1 and 7-22 and 26-36, all the claims in the application.[1] We have jurisdiction under 35 U.S.C. § 134.

The examiner cited the following references in the rejection of the claims:

[1] In addition to the brief, applicants filed an amendment which canceled claims 2, 3, 23 and 24. This amendment has been entered by the examiner.

Beran et al. (Beran)	U.S. Patent 4,508,842	Apr. 2, 1985
Tominari et al. (Tominari)	U.S. Patent 4,668,752	May 26, 1987
Warren (Warren)	U.S. Patent 4,820,557	Apr. 11, 1989
Durand et al (Durand)	U.S. Patent 4,857,611	Aug. 15, 1989
Lustig et al. (Lustig)	U.S. Patent 4,863,769	Sep. 5, 1989

Steinert et al. (Steinert)	United Kingdom 2,125,417	Mar. 7, 1984
Kohyama et al. (Kohyama)	European Application 109,779	May 30, 1984
Karol et al. (Karol)	European Application 120,503	Oct. 3, 1984
Machon et al.[2] (Machon)	Canadian Patent 1,193,395	Sep. 10, 1985
Sugahara et al.[3] (Sugahara)	Japanese Patent 63-30507	Feb. 9, 1988

The examiner made four rejections:

(1) Claims 1, 7-14, 16, 17, 20, 22 and 26-36 under 35 U.S.C. § 103 as unpatentable over the combination of the Lustig, Warren, Steinert, Machon, Kohyama, Tominari, Sugahara and Durand patents.

(2) Claims 15, 18, 19 and 21 under 35 U.S.C. § 103 as unpatentable over the combination of the Lustig, Warren, Steinert, Machon and Kohyama patents.

(3) Claims 15, 18, 19 and 21 under 35 U.S.C. § 103 as unpatentable over the combination of the Lustig, Warren, Beran and Karol patents.

(4) The provisional rejection of claims 1, 7-22 and 26-36 under the judicially created doctrine of obviousness type double patenting as being unpatentable over claims 1-14, 16-20, 22-36 and 62 of copending application Serial No. 08/060,783.

A. The claimed subject matter

The claimed subject matter is a biaxially stretched, heat shrinkable film comprising a very low density polyethylene (VLDPE). The specification at page 11 describes VLDPE as "copolymers of ethylene

[2]Australia patent 556,144, published October 23, 1986, is an English language equivalent of Machon. All page and line citations will refer to the Australian patent.

[3]The examiner and applicants refer to this reference as Petrochem (507).

and one or more alpha-olefins." The VLDPE polymers are said to have a density between 0.860 and 0.915 g/cm^3.[4] Simultaneously copolymerized ethylene, 1-hexene and 1-butene form the VLDPE terpolymer of the claimed biaxially stretched films. The claims require the terpolymer to have a density less than 0.915 g/cm^3. Some claims specify the melt index, melt flow ratio (MFR), molecular weight distribution, amount of ethylene and the amount of 1-hexene. The film is said to be suitable for packaging a variety of articles including food such as poultry, fresh red meat and processed meats and cheeses.[5]

Representative claims 1, 9, 11, 15, 18, 19, 21, 22 and 36 are reproduced below:

1. A biaxially stretched, heat shrinkable film comprising a terpolymer of monomers (a), (b) and (c), wherein
    monomer (a) comprises ethylene,
    monomer (b) comprises 1-hexene, and
    monomer (c) comprises 1-butene,
    wherein said terpolymer has a density less than 0.915 g/cm^3.

9. A film, as defined in claim 1, wherein said 1-hexene component of the terpolymer is present in a weight ratio of about 3:1 to 1:1 of 1-hexene relative to monomer (c).

11. A film, as defined in claim 1, wherein said terpolymer has a melt index of about 0.25 g/10 min.

15. A film, as defined in claim 1, wherein said terpolymer has a melt flow ratio of at least 65.

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[4]Specification, page 12, lines 28-29.

[5]Specification, paragraph bridging pages 10-11 and page 43, first paragraph.

18. A film, as defined in claim 1, wherein said terpolymer has a molecular weight distribution of at least 10.

19. A film, as defined in claim 1, wherein said terpolymer has a molecular weight distribution of at least 12.

21. A film, as defined in claim 14, wherein said terpolymer has a melt flow ratio of at least 65.

22. A film, as defined in claim 1, wherein said terpolymer has a melt index of less than about 1.0 dg/min, at least 85 percent polymer units derived from ethylene, and has a molecular weight distribution greater than 10.

36. A film, as defined in claim 1, wherein said film has a puncture resistance greater than the puncture resistance of similarly made films comprising a two monomer component derived copolymer of ethylene and either 1-butene or 1-hexene.

B. Rejections under 35 U.S.C. § 103

1. The Prior Art

a. The Steinert patent

Steinert describes terpolymers of a ethylene, butene-1 and hexene-1.[6] The terpolymer consist of 87 to 97 wt % of ethylene and are said to have a melt index of 0.5 to 1.0.[7] Steinert examples 5 and 10 describe a terpolymer of ethylene, hexene-1 and butene-1 that have, respectively, densities of 0.907 g/cm^3

[6]Steinert, page 3, lines 36-37.

[7]Steinert, page 3, lines 36-37 and 576-59.

and <0.915 g/cm^3 and mole ratios of hexene-1 to butene-1 of 2.7 and 0.1.[8] [9] Steinert teaches the terpolymer is useful as food film wrap because of its good optical properties, improved haze and low hexane extractible concentration.[10] Steinert does not describe the melt flow ratio of the terpolymers.

b. The Lustig patent

Lustig describes biaxially stretched, heat-shrinkable films made of VLDPE.[11] The VLDPE is made of ethylene and "at least one" higher alpha olefin.[12] The described higher alpha olefins include butene-1, hexene-1, 4-methylpentene-1, and octene-1.[13] The VLDPE polymers are described as having a density from about 0.86 g/cm^3 to 0.91 g/cm^3.[14] The described VLDPE polymers have a melt flow ratio from about 22 to about 40.[15] The biaxially stretched VLDPE films heat-shrink from about 30 to 50 percent at a temperature of 90°C in both the machine and transverse direction.[16] Lustig teaches that VLDPE stretched films have excellent tensile, elongation and puncture toughness properties.[17] Due to these properties, the VLDPE films are suitable for packaging food articles.[18]

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[8]Steinert, page 4, table 1 and page 5, table 3.

[9]We understand the symbol "<" to mean "less than."

[10]Steinert, page 3, lines 54-59.

[11]Lustig, column 2, lines 10-13.

[12]Lustig, column 2, lines 13-16 and 36-37.

[13]Lustig, column 3, lines 15-16.

[14]Lustig, column 2, lines 17-20.

[15]Lustig, paragraph bridging columns 8-9.

[16]Lustig, column 10, lines 18-21.

[17]Lustig, column 10, lines 22-25.

[18]Lustig, column 1, lines 10-15 and column 2, lines 10-15.

c. The Warren patent

Warren describes thermoplastic packaging films that contain a polymer formed from ethylene and "one or more alpha olefins."[19] The ethylene and an alpha olefin polymer is described as having a density of about 0.911 g/cm^3 to about 0.935 g/cm^3.[20] The polymers are described as linear low density polyethylene polymers (LLDPE).[21] The described LLDPE polymers contain ethylene and at least one higher alpha olefin.[22] The described higher alpha olefins include butene-1, hexene-1, pentene-1, and octene-1.[23] The melt flow ratio is described as the I_{10}/I_2 ratio which is the melt flow ratio of condition 190/10 to condition 190/2.16 as per ASTM D 1238.[24] Warren teaches the films can be manufactured into shrink (i.e. oriented) films.[25] Warren teaches the films to have good abuse resistance.[26]

d. The Machon patent

Machon describes the production of copolymers of ethylene and "at least one" C_4 or greater alpha olefin.[27] The polymers have densities ranging from 0.905 g/cm^3 up to 0.940 g/cm^3.[28] Machon teaches the

[19]Warren, column 2, lines 21-22.

[20]Warren, column 4, lines 16-17.

[21]Warren, column 2, lines 63-67.

[22]Warren, column 3, lines 59-62.

[23]Warren, column 3, lines 62-65.

[24]Warren, column 23, lines 26-35.

[25]Warren, column 4, lines 44-48.

[26]Warren, column 2, lines 37-42.

[27]Machon, page 4, lines 3-5.

[28]Machon, page 4, lines 5-7.

ethylene polymers are suitable for the formation of films which exhibit improved elongation at break and resistance to tearing.[29]

e. The Beran patent

Beran describes the production of copolymers[30] of ethylene and "at least one" C_3 to C_{10} alpha olefin polymers using a supported vanadium catalyst.[31] The ethylene copolymers are described to be suitable for a variety of applications including blow moldings and films.[32]

f. The Karol patent

Karol describes the production of copolymers of ethylene and "at least one" C_3 to C_8 alpha olefin.[33] The ethylene copolymers are described as having densities ranging from 0.86 g/cm^3 up to 0.91 g/cm^3.[34] The ethylene copolymers are said to be suitable for the formation of tubing, hoses and other applications where toughness and flexibility are desirable.[35]

g. The Durand patent

Durand describes terpolymers of (a) ethylene, (b) propylene and /or 1-butene and (c) a C_5 to C_8 alpha-olefin and the process for their preparation.[36] The ethylene and alpha olefin terpolymers are

[29]Machon, page 5, lines 6-28.

[30]We interpret the term "copolymer" to be polymers formed from two or more monomers.

[31]Beran, column 2, lines 37-48.

[32]Beran, column 3, lines 26-29.

[33]Karol, page 5, lines 25-32.

[34]Karol, page 8, line 25 to page 9, line 3.

[35]Karol, page 1, line 30 to page 2, line 2.

[36]Durand, column 1, lines 9-14.

described as having a density of about 0.900 g/cm^3 to about 0.935 g/cm^3.[37] Durand teaches the terpolymer is useful for the production of films with high mechanical strength.[38]

h. The Kohyama patent

Kohyama describes copolymers of an ethylene and "one or more" C_4 to C_{20} alpha olefins.[39] No examples of terpolymers have been provided. Kohyama teaches the polymers can be used to form various articles including films and have good impact strength, transparency, tear strength heat resistance and low temperature heat sealability.[40]

i. Tominari patent

Tominari describes linear copolymers of ethylene and preferably "at least one" C_4 to C_{12} alpha-olefin.[41] Tominari teaches that the polymers are suitable for the formation of various articles including films and have excellent mechanical and optical properties, blocking resistance, heat resistance, and low temperature heat sealability.[42]

j. The Sugahara patent

Sugahara describes the production of copolymers of ethylene, C_3 to C_4 alpha olefin and, C_6 to C_{12} alpha olefin.[43] The ethylene polymers are said to be suitable for the production of films with good mechanical properties, impact resistance and transparency.[44]

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[37]Durand, column 7, lines 5-10.

[38]Durand, column 8, lines 49-54.

[39]Kohyama, page 14, lines 23-32.

[40]Kohyama, page 19, lines 9-21.

[41]Tominari, column 4, lines 8-13.

[42]Tominari, column 3, lines 33-39 and column 12, lines 27-34.

[43]Sugahara, page 2, lines 18-23.

[44]Sugahara, page 4, lines 17-23.

2. Analogous Art

The applicants argue that one of ordinary skill in the art of making biaxially stretched films would not consider either catalyst or polymer resin manufacturing patents to be relevant to the biaxially stretched, heat shrinkable film art. Thus, according to applicants, the Beran, Karol, Steinert, Machon, Kohyama, Tominari, Sugahara and Durand patents, which do not expressly describe heat shrinkable, biaxially stretched films are not in the field of endeavor of the present invention.

The Federal Circuit has delineated two indicia for indicating whether prior art references are analogous: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the art is not within the same field of endeavor, whether it is reasonably pertinent to the particular problem to be solved. In re Clay, 966 F.2d 656, 658-59, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992); In re Deminski, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); In re Wood, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979).

We note that applicants' claims 1 and 7-35 require polymer properties, for example MFR, density and molecular weight distribution and not film properties, such as impact strength and elasticity, for patentability. Applicants' specification at page 11, last paragraph, states "Catalyst selection is recognized by those of ordinary skill in the art to be an important variable parameter for modifying terpolymer polymerization and resultant properties." Thus, applicants specification indicates the relevance of both polymer resins and catalysts to the claimed subject matter. We hold that the applicants' field of endeavor in this case includes ethylene copolymers and their production. All the references relied upon by the examiner describe ethylene polymers and their production. The Beran and Karol patents, for example, describe the effects on the properties of ethylene polymers produced by different catalysts.[45] The Steinert, Machon, Kohyama, Tominari, Sugahara and Durand patents describe ethylene copolymers and their

[45]Beran, column 2, lines 1-48; Karol, page 1, line 12 to page 2, line 2.

production.[46] All of these patents describe the properties of ethylene copolymers including, inter alia, the density. We hold that the references relied upon by the examiner to be within the field of ethylene copolymers and the production of ethylene copolymers. Thus, the references relied upon by the examiner are from the same field of endeavor as applicants' invention. We conclude that the patents relied on by the examiner are analogous prior art.

3. The rejection of claims 1, 7-14, 16, 17, 20, 22 and 26-36

a. The examiner's and applicants' positions

The examiner rejected claims 1, 7-14, 16, 17, 20, 22 and 26-36 under 35 U.S.C. § 103 as unpatentable over the combination of Lustig, Warren, Steinert, Machon, Kohyama, Tominari, Sugahara and Durand patents. The examiner's position may be understood from the following excerpt from the Examiner's Answer:

> It would [have been] obvious to use (C_2-C_4-C_6) terpolymer having a density less than 0.915 in the process of the primary references, i.e., to make (BSHSF) [biaxially stretched heat shrinkable films], because (1) the primary reference generically includes such terpolymers and (2) such terpolymers are known as taught by Steinert (Examples 5 and 10) or are obvious variants of ethylene polymers disclosed by the other secondary references. These terpolymers are not only included by Steinert but are described by the reference as making excellent films. Thus, Steinert teaches that the (C_2-C_4-C_6) terpolymers are especially useful for the manufacture of food wrap films (page 1, lines 47-50) and have better optical properties and lower hexane extractables than comparable C_2-C_4 or C_2-C_6 copolymers (page 3, lines 48-57). Further, such terpolymers would be obvious from Durand who teaches (1) that films made from (C_2-C_4-C_6) terpolymers having the claimed density (column 3, lines 11-17; column 7, lines 5-6) have excellent optical properties and have mechanical properties that are as good or better than (C_2-C_6) copolymers (column 1, lines 44-52) and that the (C_2-C_4-C_6) terpolymer films have high mechanical strength (column 8, lines 46-53). The films would also be obvious from Machon who teaches that (C_2-C_4-C_6) terpolymers having the

[46]Steinert, page 3, lines 36-59; Machon, page 4, lines 3-7; Kohyama, page 14, lines 23-32; Tominari, column 4, lines 8-13; Sugahara, page 2, lines 18-23; and Durand, column 1, lines 9-14.

> claimed properties make excellent films having improved resistance to tearing and improved elongation at break (page 5, lines 10-12; page 4, lines 3-6; Example 6); and Kohyama and Tominari who teach that films having improved properties may be prepared from ethylene copolymers of alpha-olefins having 4 to 20 carbon atoms including terpolymers thereof (Kohyama, page 1, lines 1-9; page 14, lines 23-26; Tominari column 1, lines 8-19; column 4, lines 7-17). The reference in Australia 556,144 on page 4 at line 52 "bulk density" is a translation error, i.e., should be merely density. Further, Petrochem (507) [Sugahara] teaches that films made from (C_2-C_4-C_6) terpolymers having the claimed properties have excellent impact strength and transparency (Abstract; page 72). Thus, it is believed that the art establishes a strong prima facie case of obviousness. [47] [Bracketed material added.]

Applicants argue the examiner has not established a prima facie case of obviousness. Applicants' position may be understood from the following excerpt from the Brief:

> All of the Examiner's rejections rely upon the Lustig et al and Warren patents as primary references. These references broadly teach production of biaxially stretched, heat shrinkable films made from VLDPE resins. These references do not disclose or teach use of the specific terpolymer resins as presently claimed. These references do have examples of VLDPE bi-polymer films and in that respect are similar to comparative examples (not of the invention) disclosed in the present application. In order to supplement the deficiencies of these primary references as evidence supporting a prima facie case of obviousness, the Examiner urges their combination with numerous other patents including the Beran et al, Karol, Kashiwa et al, Durand et al, Steinert, Machon, Kohyama, Tominari et al, Petrochem 507, and Petrochem 807 references in various combinations. Such combination of Lustig et al or Warren with these secondary references is improper. Furthermore, even if such combination were to be proper, there is no suggestion or motivation to guide one of ordinary skill in the art to the present invention. Also, the present invention exhibits an unexpected combination of properties not disclosed or taught by the cited references.[48] Emphasis original.

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[47]Examiner's Answer, paragraph bridging pages 4-5.

[48]Brief, paragraph bridging pages 9-10.

> [T]he Examiner's reasons ... puts the cart before the horse in that these references are not in the field of endeavor and absent a specific motivating factor would not be reviewed. [The examiner's reasoning] relies-upon the open ended language in Lustig et al of "ethylene and at least one high alpha olefin" and the reference in Warren is to "... a major amount of ethylene with a minor amount of one or more comonomers selected from C_3 to about C_{10} or higher alpha-olefins ..." Both of these patents utilize and disclose VLDPE bipolymers and are open to terpolymers or polymers made with 4, 5, 6, 7, or more comonomers. This does not mean that they provide any motivation for going beyond use of the exemplified commercially available bipolymers. Furthermore, there is no teaching of any means for selection from an infinite number of possible copolymer compositions to arrive at any polymer which would be equal in performance much less have any advantages over the disclosed bipolymers. Hence, there is no practical motivation in these patents to review the catalyst/polymer manufacturing patent and modify the Lustig et al and Warren teachings to arrive at the instant invention. What the Examiner is suggesting is an invitation to experiment and invent not the suggestion of a particular invention.[49] Emphasis original, [Bracketed material added.]
>
> The Steinert et al reference is concerned with the production of linear low density ethylene polymers. It is silent regarding formation of multilayer films, or biaxially stretched films, or heat shrinkable films. Also, Steinert et al suggests that the preferred terpolymers have a density of 0.915 to 0.925 g/cm^3 which is outside the range claimed by the present invention. The Steinert et al reference on page 3, lines 48-59, emphasizes that their process produces terpolymers having better haze properties than either an ethylene/butene-1 or an ethylene/hexene-1 LLDPE resin of comparable density and suggests use for making food wrap. Food wraps are typically monolayer PVC, saran or polyethylene cast or blown films and the term "food wrap" at the time of publication of the Steinert et al reference was not typically used to refer to 90ºC heat shrinkable films. Examples 5 and 10 of Steinert purportedly show production of terpolymer products having a density less than 0.915 g/cm^3. However, no film was reported for the terpolymer resin of Example 10. Furthermore, there is no indication of how the 0.9 mil film of Example 5 was made, but applicants assume that it was a pressed film or cast film in view of the paucity of reported data. The reported haze of 26% is well above the preferred maximum haze value of 12% denoted in Steinert et al on page 3, lines 57-59 for the higher density terpolymers and much higher than the haze values achievable

[49]Brief, page 17, lines 3-26.

> with oriented films. Discussion of the film of Example 5 includes a reference to % hexene extractibles, but film properties are not further characterized. It bears repeating that there is no suggestion that a heat shrinkable or biaxially stretched film was made or could be made. Given the paucity of test results, it is submitted that one of ordinary skill in the art, upon reviewing the teachings of Steinert in combination with either Lustig et al or Warren would conclude that the teachings are mutually exclusive and therefore they would not be combined. Assuming arguendo, that the combination were attempted, then it is as likely as not that an attempt would be made to use higher density terpolymers to make biaxially stretched heat shrinkable films. After all, Steinert et al points to the use of terpolymers having a density above 0.915 g/cm^3.[50]

Applicants argue the limitations of claims 9, 10, 11, 14, 22 and 26 provide unexpected results. Applicants' position may be understood from the following excerpt from the Brief:

> Especially noteworthy are appealed claims 9, 10, and 26 which define comonomer ratios of 1-hexene to 1-butene which lead to the exemplified formulations having unexpected results. Also, claims 18, 19, and 22 define an especially preferred embodiment of the invention having a broad molecular weight distribution which is exemplified in Example 1 which has an unexpected and surprising combination of high hot water puncture resistance, high dynamic puncture resistance and high shrinkage values at 90ºC. Examples 12 and 16 also demonstrate the unexpected advantages attendant to using the defined films having a broad molecular weight distribution (claims 18, 19, and 22), high melt flow ratio (claims 15 and 21), low melt index (claims 11, 14, and 22). The broad impulse sealing range of the inventive $C_2C_4C_6$ terpolymer biaxially stretched, heat shrinkable film with the high burn through resistance relative to similar C_2C_4 and C_2C_8 films is particularly noteworthy.[51]

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[50]Brief, paragraph bridging pages 27-28.

[51]Brief, page 23, lines 1-19.

Applicants also argue that the limitations of claim 36 provide unexpected results. Regarding claim 36, applicant argues:

> It is further submitted that appellants teach how to make novel biaxially stretched, heat shrinkable films having unexpected and surprising properties one unexpected advantage of the inventive films is the surprisingly good combination of high shrinkage values and high resistance to puncture especially at elevated temperatures. Claim 36 especially claims the puncture resistant feature.[52]

b. Decision on claims 1, 7-10, 12-14, 16, 17, 20, 27-31 and 33-35

Applicants have presented separate arguments for claims 1, 9, 10, 11, 14 and 36. Thus, we will separately address those claims. Claims 7, 8, 12, 13, 16, 17, 20, 27-31 and 33-35, all of which depend from claim 1, and have not been separately argued, will stand or fall with the patentability of that claim. 37 CFR § 1.192(c)(7).[53]

The examiner relies on the combination of Lustig, Warren, Steinert, Machon, Kohyama, Tominari, Sugahara, Beran, Karol and Durand patents in holding that the claimed subject matter would have been prima facie obvious. The Federal Circuit has delineated the standard for establishing a prima facie case under § 103 based on a combination of references:

> Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, inter alia, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. See In re Dow Chemical Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. Id.

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[52]Brief, page 22, paragraph 1.

[53]Although claim 32 was not separately argued, claim 32 is dependent upon claims 22 and 26. Consequently, claim 32 will stand or fall with the subject matter of claims 22 and 26.

In re Vaeck, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991).

1. Patentability of claim 1, 7, 8, 12, 13, 16, 17, 20, 27-31 and 33-35

Claims 1, is reproduced below:

> 1. A biaxially stretched, heat shrinkable film comprising a terpolymer of monomers (a), (b) and (c), wherein
> monomer (a) comprises ethylene,
> monomer (b) comprises 1-hexene, and
> monomer (c) comprises 1-butene,
> wherein said terpolymer has a density less than 0.915 g/cm^3.

The examiner rejected claims 1, 7, 8, 12, 13, 16, 17, 20, 27-31 and 33-35 under 35 U.S.C. § 103 as unpatentable over the combination of the Lustig, Warren, Steinert, Machon, Kohyama, Tominari, Sugahara and Durand patents.

Steinert describes terpolymers of an ethylene, butene-1 and hexene-1.[54] Examples 5 and 10 describe terpolymers of ethylene, hexene-1 and butene-1 that have densities of which meet the terpolymer required by applicants' claim 1.[55] The terpolymers are described as useful in the formation of food film wraps.[56] Steinert describes every limitation of claim 1 except the limitation that the film is a biaxially stretched heat shrinkable film. Lustig and Warren describe biaxially stretched heat shrinkable films made from a copolymer of ethylene and one or more alpha olefins. Thus, these patents generally teach and do not exclude terpolymers. Both Lustig and Warren teach biaxially stretched heat shrinkable films formed from ethylene polymers having densities less than 0.915 g/cm^3.[57] In our view, the person having ordinary skill in the art would have been motivated to form biaxially stretched heat shrinkable films from the terpolymers described by Steinert in order to obtain a film with improved optical properties, improved haze

[54]Steinert, page 3, lines 36-37.

[55]Steinert, page 4, table 1, and page 5, table 3.

[56]Steinert, page 3, lines 54-59.

[57]Lustig, column 2, lines 17-20; Warren, column 4, lines 16-17.

and low hexane extractable concentration. In view of the similarity of the polymers, the person of ordinary skill in the biaxially stretched heat shrinkable film art would have had a reasonable expectation of success that biaxially stretched heat shrinkable films formed from the terpolymer described by Steinert would provide the benefits of improved optical properties, improved haze and low hexane extractable concentration.

Applicants argue that even if the combination of Lustig, Warren and Steinert were attempted, it is as likely as not that an attempt would be made to use higher density terpolymers to make the biaxially stretched heat shrinkable films because Steinert points to the use of terpolymers having a density above 0.915 g/cm^3. It is well settled that a prior art reference is relevant for all it teaches to those of ordinary skill in the art. In re Fritch, 972 F.2d 1260, 1264, 23 USPQ2d 1780, 1782 (Fed. Cir. 1992). Steinert's examples 5 and 10 describe terpolymers of ethylene, hexene-1 and butene-1 that have densities of 0.907 g/cm^3 and <0.915 g/cm^3 respectively which meet the density limitations of claim 1. The person having ordinary skill in the art would have been motivated to form biaxially stretched heat shrinkable films from the terpolymer described by Steinert's examples 5 and 10 in order to obtain a film with improved optical properties, improved haze and low hexane extractable concentration as taught by Steinert.

Applicants assert that the film described in Steinert's example 5 has a reported haze of 26% which is well above the preferred maximum haze value of 12% denoted in Steinert page 3, lines 57-59. However, none of Applicants' claims require a haze value for the films. Example 5 is evidence that films can be made from ethylene terpolymers. Lustig and Warren teach the benefits of biaxially stretched heat shrinkable films.

Applicants also assert that no film was made from the terpolymer of example 10.[58] Steinert discloses the suitability for the formation of film from terpolymers that have density below 0.915 g/cm^3. The fact that Steinert does not disclose that a film was made from example 10 does not indicate that the terpolymer is not suitable for film formation. Steinert page 1, lines 50-58, describes the slurry production

[58]Brief, paragraph bridging pages 27-28.

process for the formation of ethylene, butene-1 and hexene-1 polymers which are suitable for the formation of films with reduced hexane extractable concentrations and improved optical properties. Further, example 5 is evidence that films can be made from the described ethylene terpolymers. It is not our position that Steinert's example 5 describes biaxially stretched heat shrinkable film. However, as stated above, the person having ordinary skill in the art would have been motivated to form biaxially stretched heat shrinkable films from the terpolymers described by Steinert in order to obtain biaxially stretched heat shrinkable films with improved optical properties, improved haze and low hexane extractable concentration.

Applicants argue the present invention exhibits an unexpected combination of properties not disclosed or taught by the cited references especially shrink, puncture resistance and heat sealability. It is well settled that unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice. In re Soni, 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995); In re De Blauwe, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984); see also In re Wood, 582 F.2d 638, 642, 199 USPQ 137, 140 (CCPA 1978) ("Mere lawyer's arguments and conclusory statements in the specification, unsupported by objective evidence, are insufficient to establish unexpected results."). Applicants have failed to direct us to any objective evidence, in the specification or elsewhere, comparing the closest prior art with the claimed invention. The rejection of claim 1, 7, 8, 12, 13, 16, 17, 20, 27-31 and 33-35 is affirmed.

2. Patentability of claims 9, 10 and 14

Claim 9 adds the following limitation to the subject matter of claim 1: "wherein said 1-hexene component of the terpolymer is present in a weight ratio of about 3:1 to 1:1 for 1-hexene relative to monomer (c)." Claim 10 adds the following limitation to the subject matter of claim 1: "wherein said 1-hexene component of the terpolymer is present in a weight ratio of about 3:1 of 1-hexene relative to 1-butene." It is noted that the ratio is specified in whole numbers. The specification does not describe the range that is acceptable by the use of the term "about" when describing the ratio of 1-hexene to 1-butene. Steinert's example 5 describes a terpolymer where the weight ratio for hexene-1 to butene-1 is 2.7. The

ratio of 2.7 is slightly below 3 and if 2.7 was rounded to the nearest whole number it would be 3. We find that on the present record the ratio of 2.7 is "about 3." Thus, the difference between the subject matter of claims 9 and 10 and Steinert is the limitation that the film is a biaxially stretched heat shrinkable film. This is the same difference discussed above with respect to claim 1. Accordingly, the subject matter of claims 9 and 10 would have been obvious to one of ordinary skill in the art for the reasons stated above regarding claim 1. The rejection of claims 9 and 10 is affirmed.

Claim 14 adds the following limitation to the subject matter of claim 1, "wherein said terpolymer has a melt index of about 1.0 dg/mins." Steinert's example 10 describes the melt index for the terpolymer to be 0.98 g/10 min. When the melt index of 0.98 g/10mins is converted to the units dg/mins and held to one significant digit, the melt index for example 10 would be 1.0 dg/mins. The difference between the subject matter of claim 14 and Steinert is the limitation that the film is a biaxially stretched heat shrinkable film. This is the same difference discussed above with respect to claim 1. Accordingly, the subject matter of claim 14 would have been obvious to one of ordinary skill in the art for the reasons stated above regarding claim 1. The rejection of claim 14 is affirmed.

c. Decision on claims 11, 22, 26, 32 and 36

Applicants have separately argued claims 11, 22 and 36. We treat each of these claims separately. Claims 26 and 32, which depend from claim 22, stand with claim 22.

1. Patentability of claim 11

Claim 11 adds the following limitation to the subject matter of claim 1: "wherein said terpolymer has a melt index of about 0.25 g/10 mins." Thus, the terpolymer required by claim 11 must have the combination of the specific density of less than $0.915 g/cm^3$ and melt index of 0.25 g/10 mins. Steinert's example 10 describes the melt index for the terpolymer to be 0.98 g/10min and the density to be $<0.915 g/cm^3$. This disclosure does not meet the terpolymer property limitations of claim 11. None of the other cited patents relied upon by the examiner expressly teach or describe terpolymers having the melt

index required by the claims. While some individual bipolymers[59] are disclosed, no bipolymers are disclosed having the melt index of about 0.25 g/10mins in combination with a density less than 0.915 g/cm^3. The examiner relies on the combination of Lustig, Warren, Steinert, Machon, Kohyama, Tominari, Sugahara, and Durand patents as suggesting the melt index of about 0.25 g/10mins. While some of these references disclose terpolymers made from the required monomers and terpolymers or bipolymers having one of the required properties, none of the references show a bipolymer or a terpolymer having the required combination of melt index of about 0.25 g/10mins and density less than 0.915 g/cm^3. The examiner has not directed us to any evidence that demonstrates that the person having ordinary skill in the art would be motivated to make the changes necessary to the disclosed bipolymers and terpolymers to simultaneously obtain the claimed combination of melt index and density. In proceedings before the PTO, the examiner has the burden of establishing the prima facie case of unpatentability. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). In other words, the record lacks evidence showing that one having ordinary skill in the art would be motivated to modify the melt index of the polymer while maintaining the density within the claimed range. A conclusion of obviousness based upon a combination of references requires that the references provide the person of ordinary skill in the art a reasonable expectation of success in obtaining the claimed subject matter. In re Dow Chemical Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Thus, on this record we are unable to hold that the terpolymers required by claims 11 would have been prima facie obvious. Since the terpolymers would not have been obvious, it would not have been obvious to make films from those polymers.

2. Patentability of claims 22, 26 and 32

[59]The word "bipolymer" as used here means a polymer formed from two monomers.

Claim 22 adds the following limitation to the subject matter of claim 1: "wherein said terpolymer has a melt index of less than about 1.0 dg/min, at least 85 percent polymer units derived from ethylene, and has a molecular weight distribution greater than 10." The examiner relies upon the Machon patent to describe terpolymers that have molecular weight distributions within the scope of claim 22. The Machon patent describes ethylene, hexene-1, butene-1 terpolymers in examples 6 and 7. The terpolymer of example 6 is described as having a density of 0.915 g/cm^3 and molecular weight distribution of 10.5. The terpolymer of example 7 is described as having a density of 0.933 g/cm^3 and molecular weight distribution of 7.6. Neither of Machon's examples describe a terpolymer with a density of less than 0.915 g/cm^3. The examiner has not directed us to evidence that would describe the affects on the molecular weight distribution that would occur from lowering the density of the terpolymer of Machon's examples 6 and 7 to below 0.915 g/cm^3. Due to different reaction conditions used in the Machon's examples 6 and 7, we do not see a basis for predicting how the changes in the density will impact the molecular weight distribution of the copolymer. The record lacks evidence showing that one having ordinary skill in the art would be motivated to modify the density of the polymer while maintaining the molecular weight distribution within the claimed range. A conclusion of obviousness based upon a combination of references requires that the references provide the person of ordinary skill in the art a reasonable expectation of success in obtaining the claimed subject matter. Since the terpolymers would not have been obvious, it would not have been obvious to make films from those polymers. The rejection of claims 22, 26 and 32 is reversed.

3. Patentability of claim 36

Claim 36 adds the following limitation to the subject matter of claim 1: "wherein said film has a puncture resistance greater than the puncture resistance of similarly made films comprising a two monomer component derived copolymer of ethylene and either 1-butene or 1-hexene." Before considering the rejection and applicants' arguments, it is first necessary to interpret certain language in the appealed claim, namely the phrase "similarly made films." Because of this phrase, the claim language is indefinite and hence fails to particularly point out and distinctly claim the subject matter which appellant regards as his

invention under the second paragraph of 35 U.S.C. §112 as will be discussed in detail *infra* in our new rejection entered under the provisions of 37 CFR § 1.196(b). The examiner's rejection of claim 36 is reversed because no meaningful interpretation of the claim can be made. In re Steele, 305 F.2d 859, 862-63, 134 USPQ 292, 295 (CCPA 1962). The rejection of claim 36 is reversed.

4. The rejection of claims 15, 18, 19 and 21

a. The examiner's and applicants' positions

The examiner rejected claims 15, 18, 19 and 21 under 35 U.S.C. § 103 as unpatentable over the combination of Lustig, Warren, Steinert, Machon and Kohyama patents. The examiner's position may be understood from the following excerpt from the Examiner's Answer:

> Claims 15, 18, 19 and 21 differ from the remaining claims in that they contain a molecular weight distribution limitation, i.e., the melt flow ratio MFR and the polydispersity defined as the ratio of the weight average molecular weight to the number average molecular weight.
>
> It would [have been] obvious to use the claimed terpolymers in producing the (BSHSF) of the primary references because (1) Lustig generically includes them and (2) the secondary references teach obvious variants of said terpolymers that are taught to yield excellent films (Steinert, page 1, lines 47-49; page 3, lines 48-57; Examples 5 and 10), Machon (page 4, lines 19-23; page 5, lines 6-28; page 8, lines 10-24; Example 6) and Kohyama (page 1, lines 5-9; page 14, lines 23-29; page 19, lines 9-15). As previously disclosed, the Machon terpolymers have the claimed molecular weight distribution and are said to form very tough films. The terpolymer of Example 6 with a density of 0.915 would not substantially differ from the claimed terpolymer having a density of less than 0.915.
>
> The use of the terpolymers having the broader molecular weight distribution would be especially obvious in view of Lustig because this reference does not teach that it is critical that the ethylene polymers have a narrow molecular weight distribution (column 2, lines 10-27; claims). While the copolymers prepared by the process described in Lustig have relatively narrow molecular weight distributions, i.e., MFR of 22 to 40 (column 8, line 67 to column 9, line 1), the reference does not indicate that there is a correlation between molecular weight distribution and desirable properties in the films. Thus, it is believed that the use of terpolymers

> having the claimed MFR values and polydispersity would be obvious candidates for making the (BSHSF) of Lustig.[60] [Bracketed material added.]

The examiner also rejected claims 15, 18, 19 and 21 under 35 U.S.C. § 103 as unpatentable over the combination of Lustig, Warren, Beran and Karol patents. The examiner's position may be understood from the following excerpt from the Examiner's Answer:

> These claims [15, 18, 19 and 21] differ from the remaining claims on appeal because they have molecular weight distribution limitations.
>
> While the primary references generally prefer ethylene polymers having relatively narrow molecular weight distributions, films having the claimed molecular weight distribution would be expected to produce satisfactory results since (1) Lustig does not teach that it is critical that the ethylene polymers have a narrow molecular weight distribution and (2) it is well known that ethylene polymers having wide molecular weight distributions also make excellent films, e.g., as taught by Beran (column 2, lines 51-57; column 3, lines 26-28).
>
> It would also be obvious to prepare the ethylene terpolymers by the process of Karol (page 3, line 20 to page 4, line 6) using the catalyst of Beran because (1) both references teach that ethylene terpolymers may be prepared (Karol, page 3, lines 28-29; Beran, column 2, lines 39-40, lines 60-67) and (2) Beran teaches that the ethylene polymers having densities below 0.91 g/cc are advantageously made using the process of Karol (column 5, lines 58-65). The catalyst of Beran and the process of Karol would be expected to produce ethylene terpolymers having the claimed properties (Beran, column 3, lines 3-12).[61] [Bracketed material added.]

Applicants argue that their Examples 12 and 16 demonstrate the unexpected advantages of the limitations of claims 15, 18, 19, and 21. Applicants' position may be understood from the following excerpt from the Brief: "Examples 12 and 16 also demonstrate the unexpected advantages attendant to using the defined films having a broad molecular weight distribution (claims 18, 19, and 22), high melt flow ratio (claims 15 and 21), and low melt index (claims 11, 14, and 22). The broad impulse sealing range of

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[60]Examiner's Answer, page 10, line 10 to page 11, line 16.

[61]Examiner's Answer, page 9, line 11 to page 10, line 6.

the inventive $C_2C_4C_6$ terpolymer biaxially stretched, heat shrinkable film with the high burn through resistance relative to similar C_2C_4 and C_2C_8 films is particularly noteworthy."[62]

1. Patentability of claims 15 and 21

Claims 15 adds a melt flow ratio value of at least 65 for the terpolymer of claim 1. Claim 21 requires the density of less than 0.915 g/cm^3, melt index of about 1.0 dg/min and melt flow ratio of at least 65 for the terpolymer. Thus, claims 15 and 21 require a terpolymer having at least the combination of a density of less than 0.915 g/cm^3 and melt flow ratio value of at least 65. The examiner relies on Lustig to suggest the melt flow ratio. Lustig discloses polymers having a melt flow ratio from about 22 to about 40.[63] Lustig does not disclose a melt flow ratio of at least 65. The examiner has not explained why one would have been motivated to raise the melt flow ratio of Lustig's copolymer to at least 65. Additionally, the other references relied upon by the examiner do not describe or suggest a terpolymer with a density of less than 0.915 g/cm^3 and the required melt flow ratio. The record lacks evidence showing that one having ordinary skill in the art would be able to adjust the melt flow ratio while maintaining the other properties within the claimed range. The examiner has not directed us to any evidence that demonstrates that the person having ordinary skill in the art would be able to make the changes to the melt flow ratio and simultaneously obtain the claimed density. A conclusion of obviousness based upon a combination of references requires that the references provide the person of ordinary skill in the art a reasonable expectation of success in obtaining the claimed subject matter. Since the terpolymers would not have been obvious, it would not have been obvious to make films from those polymers. The rejection of claims 15 and 21 is reversed.

2. Patentability of claims 18 and 19

Claim 18 adds the limitation "said terpolymer has a molecular weight distribution of at least 10" to the subject matter of claim 1. Claim 19 adds "said terpolymer has a molecular weight distribution of at least

[62]Brief, page 23, lines 1-19.

[63]Lustig, paragraph bridging columns 8-9.

12." The examiner relies upon the Machon patent to describe terpolymers that have molecular weight distributions within the scope of the claims. The rejection of claims 18 and 19 is reversed for the reasons stated above regarding claim 22.

C. Obviousness type double patenting

1. The examiner's and applicants' position

On May 12, 1993, the applicants filed two applications, 08/060,783 and 08/060,891, both claiming the subject matter directed to biaxially stretched films. In the first office action, paper no. 3, the examiner rejected claims 1-36, all the claims in the application, over the claims 1-36 and 62 of copending application 08/060,783 under the judicially created doctrine of obviousness type double patenting.

Applicants do not contest the merits of the rejection but contends that the rejection is not ripe for review. Applicants' position may be understood from the following excerpt from the Brief:

> Issue I [the obviousness type double patenting rejection] is not ripe for review inasmuch as the rejection is a provisional rejection because the allegedly conflicting claims have not yet been patented. It is noted that a terminal disclaimer may obviate this type of rejection, however, because no application has been allowed and the conflicting claims are also on appeal, it would be premature for the applicant to file such disclaimer.[64] [Bracketed material added.]

The provisional obviousness-type double patenting rejection is affirmed.

Applicants' argument that the provisional double patenting rejection is not ripe for review is simply wrong. This board and its reviewing courts have sanctioned and reviewed provisional double patenting rejections based upon claims in a copending application. E.g., In re Longi, 759 F.2d 887, 892, 225 USPQ 645, 648 (Fed. Cir. 1985) (double patenting rejection over claims of three copending applications affirmed on the merits); In re Mott, 539 F.2d 1291, 1296, 190 USPQ 536, 541 (CCPA 1976) (double patenting rejection under 37 CFR § 101 over claims in a copending application was held correct on the merits but reversed because rejection was made final rather than provisional); In re Wetterau, 356 F.2d

[64]Appeal brief, page 6, second paragraph.

556, 558, 148 USPQ 499, 501 (CCPA 1966) (affirming provisional double patenting rejection over claims in a copending application on the merits). Had applicants asserted that the subject matter of claims 1-36 and 62 was patentably distinct from the subject matter of claims 1-36 of the copending application, the issue would have been reviewable by both this board and the courts on judicial review. Applicants cannot strip the board of its jurisdiction simply by failing to argue the merits. Accordingly, the provisional rejection of claims 1, 7-22 and 26-36 is affirmed.

D. New Ground of rejection

Claim 36 is rejected, pursuant to 37 CFR § 1.196(b), as unpatentable under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter which applicants regard as their invention. The claim requires a comparison between terpolymer films and copolymer films having two monomers which are "similarly made." One of ordinary skill in the art would not know from this record what is meant by "similarly made." The specification does not describe to one of ordinary skill in the art what films are "similarly made." The specification does not provide any standards for determining the meaning of "similarly." See, Seattle Box Co. v. Industrial Crating & Packing, Inc., 731 F.2d 818, 826, 221 USPQ 568, 574 (Fed. Cir. 1984) (when words of degree are used in a claim, the specification must provide some standard for measuring the degree). Additionally, one having ordinary skill in the art would not know which films to compare. For example, is a film made of a terpolymer of 80% ethylene, 10% 1-hexene and 10% 1-butene to be compared with a film made of 80% ethylene, and 20% 1-hexene or 1-butene or with one made of 90% ethylene, and 10% 1-hexene or 1-butene. Because of the difference in composition the "comparison" films would have different properties. The person having ordinary skill in the art would be required to guess at which films are necessary for comparison. The person of ordinary skill in the art would not know from this record how to do the comparison required by the claim.

E. Summary of Decisions

The rejection of claims 1, 7-10, 12-14, 16, 17, 20, 27-31 and 33-35 under 35 U.S.C. § 103 as unpatentable over the combination of Lustig, Warren, Steinert, Machon, Kohyama, Tominari, Sugahara and Durand patents is affirmed.

The rejection of claims 11, 22, 26, 32 and 36 under 35 U.S.C. § 103 as unpatentable over the combination of Lustig, Warren, Steinert, Machon, Kohyama, Tominari, Sugahara and Durand patents is reversed.

The rejections of claims 15, 18, 19 and 21 under 35 U.S.C. § 103 as unpatentable over the combination of Lustig, Warren, Steinert, Machon and Kohyama patents and over the combination of Lustig, Warren, Beran and Karol patents are reversed.

The provisional rejection of claims 1, 7-22 and 26-36 under the judicially created doctrine of obviousness type double patenting as being unpatentable over claims 1-14, 16-20, 22-36 and 62 of copending application Serial No. 08/060,783 is affirmed.

A new ground of rejection pursuant to 37 CFR § 1.196(b), claim 36 is rejected as unpatentable under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter which applicants regard as their invention.

F. Time for taking action

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b). 37 CFR § 1.196 (b) provides that, "a new ground of rejection shall not be considered final for the purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under 37 CFR § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART, NEW GROUND OF REJECTION

	)
RICHARD E. SCHAFER	)
Administrative Patent Judge	)
	)
	)
	) BOARD OF PATENT
JAMESON LEE	)
Administrative Patent Judge	) APPEALS AND
	)
	) INTERFERENCES
	)
RICHARD TORCZON	)
Administrative Patent Judge	)

RES:yrt

Appeal No. 1996-0328
Application 08/060,891

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